

401 KAR 59:015. New indirect heat exchangers.

RELATES TO: KRS 224.10, 40 C.F.R. Part 60, Subparts D, Da, Db, Dc, Appendices A, B, Part 63, Subparts DDDDD, UUUUU, JJJJJ

STATUTORY AUTHORITY: KRS 224.10-100(5)

NECESSITY, FUNCTION, AND CONFORMITY: KRS 224.10-100(5) requires the cabinet to promulgate administrative regulations for the prevention, abatement, and control of air pollution. This administrative regulation establishes requirements for the control of emissions from new indirect heat exchangers.

Section 1. Definitions. (1) "Affected facility" means an indirect heat exchanger having a heat input capacity greater than one (1) million BTU per hour (MMBTU/hr).

(2) "Classification date" means:

(a) August 17, 1971, for an affected facility with a capacity greater than 250 MMBTU/hr heat input; and

(b) April 9, 1972, for an affected facility with a capacity of 250 MMBTU/hr heat input or less.

(3) "Fuel" means any material combusted for the purpose of creating useful heat.

(4) "GCV" means gross calorific value.

(5) "Indirect heat exchanger" means a piece of equipment, apparatus, or contrivance used for the combustion of fuel in which the energy produced is transferred to its point of usage through a medium that does not come in contact with or add to the products of combustion.

(6) "Shutdown period" means:

(a) For a source subject to 40 C.F.R. Part 63, Subpart DDDDD, UUUUU, or JJJJJ, the period defined as "shutdown" in:

1. 40 C.F.R. 63.7575;

2. 40 C.F.R. 63.10042; or

3. 40 C.F.R. 63.11237; or

(b) For a source not subject to 40 C.F.R. Part 63, Subpart DDDDD, UUUUU, or JJJJJ, the period:

1. Beginning when whichever occurs first:

a. The affected facility no longer supplies useful thermal energy for heating, cooling, process purposes, or generation of electricity; or

b. Fuel is not being combusted in the affected facility; and

2. Ending when:

a. The affected facility no longer supplies useful thermal energy for heating, cooling, process purposes, or generation of electricity; and

b. Fuel is not being combusted in the affected facility.

(7) "Startup period" means:

(a) For a source subject to 40 C.F.R. Part 63, Subpart DDDDD, UUUUU, or JJJJJ, the period defined as "startup" in:

1. 40 C.F.R. 63.7575;

2. 40 C.F.R. 63.10042; or

3. 40 C.F.R. 63.11237; or

(b) For a source not subject to 40 C.F.R. Part 63, Subpart DDDDD, UUUUU, or JJJJJ, the period:

1. Beginning with either:

a. The combustion of any fuel in an affected facility for the purpose of supplying useful thermal energy for heating, cooling, process purposes, or generation of electricity; or

b. The combustion of fuel in an affected facility for any purpose after a shutdown event; and

2. Ending after the longest manufacturer-recommended time required to engage all control devices utilized by the affected facility applicable to the pollutant, not to exceed four (4) hours after any of the useful thermal energy from the affected facility is supplied for any purpose.

(8) "Useful thermal energy" means energy that meets the minimum operating temperature, flow, or pressure required by an energy use system that uses energy provided by the affected facility.

Section 2. Applicability. (1) This administrative regulation shall apply to an affected facility commenced on or after the applicable classification date.

(2) An affected facility subject to 40 C.F.R. 60.40 through 60.46 (Subpart D), 60.40Da through 60.52Da (Subpart Da), 60.40b through 60.49b (Subpart Db), or 60.40c through 60.48c (Subpart Dc) shall be exempt from Sections 3 through 6 of this administrative regulation for each pollutant covered under this administrative regulation with a specific emission standard in the applicable New Source Performance Standard (NSPS) codified at 40 C.F.R. Part 60.

Section 3. Method for Determining Allowable Emission Rates. (1) Except as established in subsection (3) of this section, the total rated heat input capacity of all affected facilities at a source, including those for which an application to construct, modify, or reconstruct has been submitted to the cabinet, shall be used as established in Sections 4 and 5 of this administrative regulation to determine the allowable emission rate in terms of lb/MMBTU heat input.

(2) The permitted allowable emissions rate of an affected facility shall not be changed due to inclusion or shutdown of another affected facility at the source.

(3) A source may submit a request to the cabinet for approval of an allowable emission rate apportioned independently from individual heat input pursuant to this subsection, as established in paragraphs (a) through (f) of this subsection.

(a) The following equation shall be used to determine the allowable emissions rate:

$$F = (AB + DE)/C, \text{ in which:}$$

1. A = allowable emission rate (in lb/MMBTU heat input) determined pursuant to subsection (1) of this section;

2. B = total rated heat input (in MMBTU/hr) of all affected facilities at the source commenced on or after the applicable classification date, including those for which an application to construct, modify, or reconstruct has been submitted to the cabinet;

3. C = total rated heat input (in MMBTU/hr) of all affected facilities at the source, including those for which an application to construct, modify, or reconstruct has been submitted to the cabinet;

4. D = allowable emission rate (in lb/MMBTU heat input) determined pursuant to 401 KAR 61:015, Section 3(1);

5. E = total rated heat input (in MMBTU/hr) of all affected facilities at the source commenced before the applicable classification date; and

6. F = alternate allowable emission rate in lbs per actual MMBTU heat input.

(b) In determining an alternative allowable emission rate for sulfur dioxide, the formula established in paragraph (a) of this subsection shall utilize values for allowable emissions rates for an affected facility stated in terms of total rated heat input capacity based on the use of the same fuel category (solid, liquid, or gaseous fuel), which shall be determined by utilizing the formulas established in Section 5 of this administrative regulation.

(c) The total emissions in (lb/hr) from all affected facilities at the source subject to this administrative regulation divided by the total actual heat input (in MMBTU/hr) of the affected facilities shall not exceed the alternate allowable emission rate as determined in paragraph (a) of this subsection.

(d) A source operating an affected facility that is not subject to a federal NSPS codified at 40 C.F.R. Part 60 only because the affected facility commenced construction prior to the NSPS classification date, shall not allow emissions of the affected facility to exceed the allowable emission rate determined pursuant to Sections 4 and 5 of this administrative regulation.

(e) The source shall demonstrate compliance with this subsection by conducting a performance test pursuant to 401 KAR 50:045 for each affected facility subject to this administrative regulation.

(f) The source shall demonstrate that compliance with this subsection shall be maintained on a continuous basis.

Section 4. Standard for Particulate Matter. Except as established in Sections 3(3) and 7 of this administrative regulation, an affected facility subject to this administrative regulation shall not cause emissions of particulate matter in excess of:

(1)(a) 0.56 lb/MMBTU actual heat input for sources with total heat input capacity totaling ten (10) MMBTU/hr or less for all affected facilities at the source;

(b) 0.10 lb/MMBTU actual heat input for sources with total heat input capacity totaling 250 MMBTU/hr or more for all affected facilities at the source; and

(c) 0.9634 multiplied by the quantity obtained by raising the total heat input capacity (in MMBTU/hr) to the -0.2356 power for sources with heat input values totaling greater than ten (10) MMBTU/hr and less than 250 MMBTU/hr for all affected facilities at the source; and

(2) Twenty (20) percent opacity, except:

(a) For a source with heat input capacity totaling 250 MMBTU/hr or more for all affected facilities at the source, a maximum of twenty-seven (27) percent opacity shall be allowed for one (1) six (6) minute period in any sixty (60) consecutive minutes;

(b) For a source with total heat input capacity of less than 250 MMBTU/hr for all affected facilities at the source, a maximum of forty (40) percent opacity shall be allowed for a maximum of six (6) consecutive minutes in any sixty (60) consecutive minutes during fire box cleaning or soot blowing; and

(c) For emissions from an affected facility caused by building a new fire, emissions during the period required to bring the boiler up to operating conditions shall be allowed, if the method used is recommended by the manufacturer and the time does not exceed the manufacturer's recommendations.

Section 5. Standard for Sulfur Dioxide. (1) Except as established in Sections 3(3) and 7 of this administrative regulation, an affected facility subject to this administrative regulation shall not cause emissions of gases that contain sulfur dioxide in excess of:

(a) For a source with heat input capacity totaling ten (10) MMBTU/hr or less for all affected facilities at the source:

1. Three and zero-tenths (3.0) lb/MMBTU actual heat input for combustion of liquid and gaseous fuels; and

2. Five and zero-tenths (5.0) lb/MMBTU actual heat input for combustion of solid fuels;

(b) For sources with heat input capacity totaling 250 MMBTU/hr or more for all affected facilities at the source:

1. Eight-tenths (0.8) lb/MMBTU actual heat input for combustion of liquid and gaseous fuels; and

2. One and two-tenths (1.2) lb/MMBTU actual heat input for combustion of solid fuels; and

(c) For a source with total heat input values greater than ten (10) MMBTU/hr and less than 250 MMBTU/hr for all affected facilities at the source, the standard, in lb/MMBTU actual heat input, shall be equal to:

1. For an affected facility combusting liquid fuels, the lesser of:
 - a. Three and zero-tenths (3.0) lb/MMBTU; or
 - b. The value of 7.7223 multiplied by the quantity obtained by raising to the -0.4106 power the total heat input capacity (in MMBTU/hr) of the affected facilities combusting liquid fuels;
 2. For an affected facility combusting gaseous fuels, the lesser of:
 - a. Three and zero-tenths (3.0) lb/MMBTU; or
 - b. The value of 7.7223 multiplied by the quantity obtained by raising to the -0.4106 power the total heat input capacity (in MMBTU/hr) of the affected facilities combusting gaseous fuels;
 - and
 3. For an affected facility combusting solid fuels, the lesser of:
 - a. Five and zero-tenths (5.0) lb/MMBTU; or
 - b. The value of 13.8781 multiplied by the quantity obtained by raising to the -0.4434 power the total heat input capacity (in MMBTU/hr) of the affected facility combusting solid fuels.
- (2) For simultaneously combusting different fuels in combination, the applicable standard shall be determined by prorating BTUs pursuant to the following equation: Allowable sulfur dioxide emission in lb/MMBTU = $\frac{[x(a) + y(b) + z(c)]}{(x + y + z)}$, in which:
- (a) x = percent total heat input derived from liquid fuel;
 - (b) y = percent total heat input derived from gaseous fuel;
 - (c) z = percent total heat input derived from solid fuel;
 - (d) a = allowable sulfur dioxide emission in lb/MMBTU derived from liquid fuel;
 - (e) b = allowable sulfur dioxide emission in lb/MMBTU derived from gaseous fuel; and
 - (f) c = allowable sulfur dioxide emission in lb/MMBTU derived from solid fuel.
- (3) Compliance shall be based on the total heat input from all fuels combusted.

Section 6. Test Methods and Procedures. (1) Except as established in 401 KAR 50:045, the reference methods established in 40 C.F.R. Part 60, Appendix A, shall be used to determine compliance with Sections 4 and 5 of this administrative regulation as established in paragraphs (a) through (e) of this subsection.

- (a) Reference Method 1 shall be used for the selection of sampling site and sample traverses.
 - (b) Reference Method 3 shall be used for gas analysis in applying Reference Methods 5 and 6.
 - (c) Reference Method 5 shall be used for concentration of particulate matter and the associated moisture content.
 - (d) Reference Method 6 shall be used for the concentration of sulfur dioxide. and
 - (e) Reference Method 9 shall be used for visible emissions.
- (2) For Reference Method 5:
- (a) Reference Method 1 shall be used to select the sampling site and the number of traverse sampling points;
 - (b) The sampling time for each run shall be at least sixty (60) minutes, and the minimum sampling volume shall be 0.85 dscm (thirty (30) dscf), except smaller sampling times or volumes, if necessitated by process variables or other factors, may be requested by the source; and
 - (c) The probe and filter holder heating systems in the sampling train shall be set to provide a gas temperature not greater than 160 degrees Centigrade (320 degrees Fahrenheit).
- (3) For Reference Method 6:
- (a) The sampling site shall be the same as the site selected for Reference Method 5;
 - (b) The sampling point in the duct shall be at the centroid of the cross section or at a point

no closer to the walls than one (1) meter (3.28 ft);

(c) The sample shall be extracted at a rate proportional to the gas velocity at the sampling point;

(d) The minimum sampling time shall be twenty (20) minutes, and the minimum sampling volume shall be 0.02 dscm (0.71 dscf) for each sample;

(e) The arithmetic mean of two (2) samples shall constitute one (1) run; and

(f) Samples shall be taken at approximately thirty (30) minute intervals.

(4) For each run using the methods established by subsection (1) of this section, the emissions expressed in g/MMcal (lb/MMBTU) shall be determined by the following procedure:

$$E = \frac{20.9CF}{20.9 - \%O_2}$$

, in which:

(a) E = pollutant emission, g/MMcal (lb/MMBTU);

(b) C = pollutant concentration, g/dscm (lb/dscf), as determined by Reference Methods 5 or 6;

(c) Percent oxygen:

1. Shall equal oxygen content by volume (expressed as a percent), dry basis; and

2. Shall be determined using the integrated or grab sampling and analysis procedures of Reference Method 3.

a. For determination of sulfur dioxide emissions, the oxygen sample shall be obtained simultaneously at the same point in the duct as used to obtain the samples for Reference Method 6. determinations

b. For determination of particulate emissions, the oxygen sample shall be obtained simultaneously by traversing the duct at the same sampling location used for each run of Reference Method 5 pursuant to subsection (2) of this section, using Reference Method 1 for selection of the number of traverse points, except that not more than twelve (12) points shall be required; and

(d) F = a factor as determined in 40 C.F.R. 60.45(f).

(5) If an affected facility fires a combination of fuels, the heat input, expressed in cal/hr (BTU/hr), shall be determined during each testing period by multiplying the GCV of each fuel fired by the rate of each fuel combusted, in which:

(a) GCV shall be determined in accordance with the applicable ASTM methods D2015-66(72) (solid fuels), D240-76 (liquid fuels), or D1826-64(75) (gaseous fuels), incorporated by reference in 401 KAR 50:015; and

(b) The rate of fuels combusted during each testing period shall be determined by the applicable method and shall be confirmed by a material balance over the steam generation system.

Section 7. Standards During a Startup Period or a Shutdown Period. During a startup period or a shutdown period, an owner or operator shall comply with the work practice standards established in this section. (1)(a) The owner or operator shall comply with 401 KAR 50:055, Section 2(5);

(b) The frequency and duration of startup periods or shutdown periods shall be minimized by the affected facility;

(c) All reasonable steps shall be taken by the owner or operator to minimize the impact of emissions on ambient air quality from the affected facility during startup periods and shutdown periods;

(d) The actions, including duration of the startup period, of the owner or operator of each affected facility during startup periods and shutdown periods, shall be documented by signed, contemporaneous logs or other relevant evidence; and

(e) Startups and shutdowns shall be conducted according to either:

1. The manufacturer's recommended procedures; or
2. Recommended procedures for a unit of similar design, for which manufacturer's recommended procedures are available, as approved by the cabinet based on documentation provided by the owner or operator of the affected facility; or

(2)(a) An affected facility subject to 40 C.F.R. 63.7500 shall meet the work practice standards established in 40 C.F.R. Part 63, Table 3 to Subpart DDDDD, as established in 401 KAR 63:002, Section 2(4)(iiii);

(b) An affected facility subject to 40 C.F.R. 63.9991 shall meet the work practice standards established in 40 C.F.R. Part 63, Table 3 to Subpart UUUUU, as established in 401 KAR 63:002, Section 2(4)(yyyy); or

(c) An affected facility subject to 40 C.F.R. 63.11201 shall meet the work practice standards established in 40 C.F.R. Part 63, Table 2 to Subpart JJJJJJ, as established in 401 KAR 63:002, Section 2(4)(jjjjj). (5 Ky.R. 406; Am. 1023; eff. 6-6-1979; 7 Ky.R. 227; 456; eff. 1-7-1981; TAm eff. 8-9-2007; 35 Ky.R. 1253; 1787; 2044; eff. 4-3-2009; 37 Ky.R. 957; eff. 10-7-2010; 44 Ky.R. 797, 1534; eff. 3-9-2018.)